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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/531,302	04/14/2005	Richard M Amos	124-1113	4852

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EXAMINER	
SESE, JASON A	

ART UNIT	PAPER NUMBER
4174	

MAIL DATE	DELIVERY MODE
11/13/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/531,302	AMOS ET AL.	
	Examiner	Art Unit	
	Jason A. Sese	4174	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *28 August 2007*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *2-17,19,20 and 22-27* is/are pending in the application.

4a) Of the above claim(s) *24-26* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *2-17, 19-20, 22-23 and 27* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *14 April 2005* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *28 August 2007; 14 April 2005*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Election/Restrictions

1. Claims 2-17 and 27 were amended by the applicant to depend from the article claim 19, and have been included under the elected subject matter. If claims to the elected article are found to be allowable, claims 24 and 25 will be considered for rejoinder.

Priority

2. Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. Claims 2-5, 7-10, 14, 17, 19, 22-23, and 27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wood et al. (WO 02/08825), in view of Heckmeier et al. (WO 02/44801) and Seiberle et al. (WO 00/59966). For the purposes of this office action, references to Wood et al. will refer to a document within the same patent family (U.S. Patent 7,053,975).

5. **Regarding Claims 2-3, 7-10, 17 and 19**, the applicant claims a liquid crystal alignment layer comprising a polymerised photopolymer bearing a surface profile wherein the polymerised photopolymer comprises a cured photopolymer mixture comprising at least a first

polymerisable material and a second polymerisable material in proportion such that the mixture has a predetermined surface energy, and promotes a homeotropic orientation.

Wood et al. disclose a surface alignment grating structure treated with, or formed from, a material that induces a homeotropic alignment of the liquid crystal director. Wood et al. are silent to the composition of the grating structure, but state that various methods are well known (col. 5, lines 10-14).

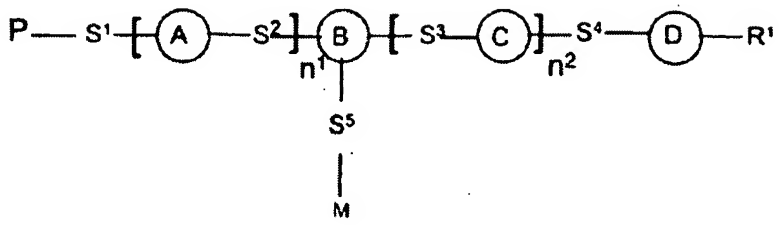
Heckmeier et al. disclose that low energy surfaces induce homeotropic alignment to liquid crystal molecules (pg. 2, lines 5-9).

Seiberle et al. disclose photoactive polymer compositions for high tilt (homeotropic) alignment layers. They describe that the polymer of the invention may be a mixture with other polymers, oligomers and monomers (or additives) to modify the composition to obtain specific properties, such as pretilt angles, surface wetting and surface anchoring energy (page 34, lines 21-31).

Because Heckmeier et al. state that it is known that low energy surfaces induce homeotropic alignment, it would have been obvious to one of ordinary skill to form the alignment structure of Wood et al. from the polymer mixture of Seiberle et al., incorporating components and additive that would give the lowest surface energy possible.

6. **Regarding Claims 4-5 and 27**, the applicant claims a liquid crystal alignment layer as claimed in claim 27 wherein the first polymerisable material is an oligomer or diluent, and the second polymerisable material is a monomer.

Seiberle et al. disclose Formula I shown below, which consists of a an oligomer polymerized with monomer units **M**.



Formula I - Seiberle et al.

7. **Regarding Claim 14**, the applicant claims a liquid crystal alignment layer as claimed in claim 19 wherein the proportion of first material to second material is such so as to give a predetermined viscosity and refractive index.

Absent a showing of criticality with respect to thickness (a result effective variable), Based on the viscosity and refractive index of the first and second materials, it would have been obvious to a person of ordinary skill in the art at the time of the invention to adjust the refractive index and viscosity through routine experimentation in order to achieve a polymer mixture with the desired properties. It has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. In re Boesch, 617 F.2d 272, 205 USPQ 215 (CCPA 1980).

8. **Regarding Claims 22-23**, the applicant claims a liquid crystal cell comprising a liquid crystal material located between two cell walls wherein at least one of the cells walls carries an alignment layer according to claim 19, and the alignment layer has the same apparent refractive index as the liquid crystal material.

Wood et al. disclose a structure wherein the liquid crystal is located between two cell walls, wherein at least one cell wall carries an alignment layer (claim 1). Further, in order to

prevent the distortion of light, it would have been obvious to one of ordinary skill in the art to match the refractive index of the alignment layer with the refractive index of the liquid crystal material.

9. Claims 11-13 and 15-16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wood et al. (WO 02/08825), Heckmeier et al. (WO 02/44801) and Seiberle et al. (WO 00/59966) as applied to claim 19 above, and further in view of Amimori et al. (U.S. 6,559,915). For the purposes of this office action, references to Wood et al. will refer to a document within the same patent family (U.S. Patent 7,053,975).

The applicant a liquid crystal alignment layer as comprising an immiscible component of polymerizable material or solid particulate wherein the refractive index and viscosity are controlled.

Within optical films, immiscible components are commonly added to affect properties of the film such as thermo-mechanical characteristics and diffusion of light. Amimori et al. disclose the addition of polymer or inorganic particles to change the refractive properties of the film (col. 12, line 62- col. 13, line 35). Because immiscible additives are well-known in the art, it would have been obvious to one of ordinary skill to include these in the alignment film of the applicant, which can also affect optical properties.

Absent a showing of criticality with respect to refractive index and viscosity (result effective variables), it would have been obvious to a person of ordinary skill in the art at the time of the invention to adjust the refractive index and viscosity through routine experimentation in order to achieve a polymer mixture with the desired properties. It has been held that discovering an optimum value of a result

effective variable involves only routine skill in the art. In re Boesch, 617 F.2d 272, 205 USPQ 215 (CCPA 1980).

10. **Claim 20 is rejected under 35 U.S.C. 103(a) as being unpatentable over Wood et al. (WO 02/08825), Heckmeier et al. (WO 02/44801) and Seiberle et al. (WO 00/59966) as applied to claim 19 above, and further in view of Bryan-Brown et al. (WO 99/18474).**

The applicant claims a liquid crystal alignment layer according to claim 19 wherein the alignment layer is formed on a substrate and surface energy of the alignment layer in contact with the substrate is greater than the surface energy of the alignment layer which, in use, contacts the liquid crystal material.

Bryan-Brown et al. disclose a polymer alignment layer applied to the substrate has a low surface energy on the liquid crystal side of the alignment layer, and has a greater affinity at the surface of the substrate (page 12, lines 15-32).

Because the alignment film as claimed in claim 1 maintains such a low surface energy at the liquid crystal interface, it would have been obvious to one of ordinary skill in the art to create an alignment layer having a higher surface energy at the substrate interface, to ensure good adhesion with the substrate, as demonstrated by Bryan-Brown.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jason A. Sese whose telephone number is 571-270-3473. The examiner can normally be reached on Mon-Thurs, 8am-5pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, D. Lawrence Tarazano can be reached on 571-272-1515. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Jason A. Sese
Examiner
Art Unit 4174